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Technical Memorandum

Prepared for: City of Bellingham Public Works Department

Project Title: Post Point Resource Recovery Plant Biosolids Project Phase 3 – Facility Plan and Nitrogen Removal Impact Study and Phase 4 – Preliminary Design

Project No.: 154154.330.331

Technical Memorandum No. 17

Subject: Post Point Resource Recovery Plant Biosolids Project Delivery Method Evaluation

Date: October 18, 2021

To: Steven Bradshaw, City of Bellingham, Superintendent of Plants

From: Mike Thorstenson, Brown and Caldwell, Project Manager

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Limitations:

This is a draft memorandum and is not intended to be a final representation of the work done or recommendations made by Brown and Caldwell. It should not be relied upon; consult the final report.

This document was prepared solely for the City of Bellingham in accordance with professional standards at the time the services were performed and in accordance with the contract between City of Bellingham and Brown and Caldwell dated November 18, 2019. This document is governed by the specific scope of work authorized by the City of Bellingham; it is not intended to be relied upon by any other party except for regulatory authorities contemplated by the scope of work. We have relied on information or instructions provided by the City of Bellingham and other parties and, unless otherwise expressly indicated, have made no independent investigation as to the validity, completeness, or accuracy of such information.

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Summary

This Technical Memorandum (TM) summarizes the activities and Brown and Caldwell's (BC) recommendations to date for the Post Point Resource Recovery Biosolids Project (Project) delivery method evaluation for onsite facilities.

This TM is based on information obtained via three workshops held between City of Bellingham (City) staff and BC, supported with materials provided by the Water Design-Build Council (WDBC) and the Design-Build Institute of America (DBIA). The three workshops were held:

- Workshop 1 – Project Drivers (March 24, 2021)
- Workshop 2 – Implementing Collaborative Delivery (March 31, 2021)
- Workshop 3 – Risk, Detailed Scoring, and Preliminary Recommendations (May 4, 2021)

At the outset of Workshop 1, the City asked BC to consider both General Contractor/Construction Manager (GC/CM, also referred to as Construction Management at Risk [CMAR]) and Design-Build (DB) delivery methods as an alternative to Design-Bid Build (DBB) delivery, although DBB was discussed as a baseline for context.

In summary, both GC/CM and PDB implementations would serve the City well. However, the City's past positive experience with GC/CM and the certainty of applying proven treatment process design points to a GC/CM delivery methodology for the Project.

Section 1: Introduction

The City is in the planning process to evaluate options for long-term biosolids management and beneficial use opportunities for wastewater solids recovered from Post Point.

The Project planning process has followed a phased approach, including Phases 1, 2, and 3, to consider all possible alternatives and narrow down options to a preferred biosolids and energy management alternative. The City's phased planning and project implementation process includes Phase 1 – Preferred Conceptual Alternative Selection, Phase 2 – Final Alternative Selection, Phase 3 – Biosolids Facility Plan and Nitrogen Removal Impact Study, Phase 4 – Preliminary Design, Phase 5 – Detailed Design, and Phase 6 – Construction.

Phase 1 included the initial identification of all potential biosolids and energy alternatives, screening to identify viable alternatives for further evaluation, and the selection of a preferred conceptual alternative. In February 2019, the results of Phase 1 were summarized in Technical Memorandum (TM) No. 1 (TM 1) – Preferred Conceptual Alternative Selection. Phase 2 further developed the preferred conceptual alternative and evaluated specific processes for biosolids treatment, biogas end uses, and other processes. In May 2019, TM 2 – Final Alternative Selection summarized the results of Project planning Phase 2. Phase 3 further refines the selected alternative technical requirements and documents the planning effort within the Biosolids Facility Planning Report (Biosolids Facility Plan) and is an update to the City's existing, comprehensive 2011 Wastewater Facility Planning Report (Carollo, 2011).

This TM No.17 (TM 17) describes the delivery method evaluation for the onsite portion of the Project and provides the path forward for a delivery approach. Off-site facilities delivery methods are not within the scope of TM 17.

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Section 2: Delivery Method Options Considered

2.1 Methods Evaluated

BC reviewed potential procurement and delivery methods with the City in order to make recommendations regarding the most appropriate delivery method for the Post Point on-site project components.

Delivery methods discussed and evaluated for the Project:

- Traditional Design-Bid-Build (DBB)
- General Contractor/Construction Manager (GC/CM)
  (also commonly referred to as Construction Management At-Risk [CMAR])
- Design-Build (DB) options
  - Progressive Design-Build (PDB)
  - Fixed-Price Design-Build (FPDB)

In support of the above, this TM summarizes the benefits and risks of each delivery approach and applies several evaluation criteria based on the City's Project objectives to support in the ultimate recommendation of delivery method(s) for the Project.

A key consideration in assessing the collaborative delivery spectrum is permissibility under applicable state and local statutes. In Washington, per state and local laws (RCW 39.10 – Alternative Public Works Contracting Procedures), collaborative delivery methods are permissible for public agencies delivering projects greater than $2 million and that meet other criteria. An approval process applies for obtaining State authorization for using a delivery method other than DBB. While specifics of this approval process are beyond the scope of this TM-17, the delivery methods evaluated are all permissible in the State of Washington.

2.1.1 Advantages and Disadvantages of Each Method

The procurement methods and their resulting delivery models available to the City take numerous forms, ranging from standard DBB delivery to turn-key approaches with significant risk transfer, including several variants of Design-Build (DB). GC/CM and DB methods (collectively referred to as "collaborative delivery" methods) were the approaches primarily considered by the City during the workshops, in the context of a general discussion that included the full spectrum of delivery options, including fixed-price Design-Build as a baseline reference.

The spectrum of available options considered for the City is illustrated in Figure 1.

The project delivery and procurement methods, as shown in Figure 1, have generally evolved from the traditional DBB approach, which is considered the "baseline" (i.e., most commonly used) by public entities. In recent decades, various collaborative delivery methodologies have emerged as viable alternatives to traditional delivery. These alternatives to DBB seek to better allocate risk and responsibility, save time, and support selection methodologies beyond low-bid capital price. The potential improvement to traditional delivery is supported by re-defined contractual relationships. These relationships are shown in Figure 1 via two forms:

- Formal Contractual Relationships (illustrated with the puzzle piece, and as amended with the dotted-line puzzle piece) indicate firm contractual agreements executed between the given entities, and
- Embedded Relationships (illustrated with the dotted green line) represent the collaborative connections required, but not formally contracted, to make the given model a success.

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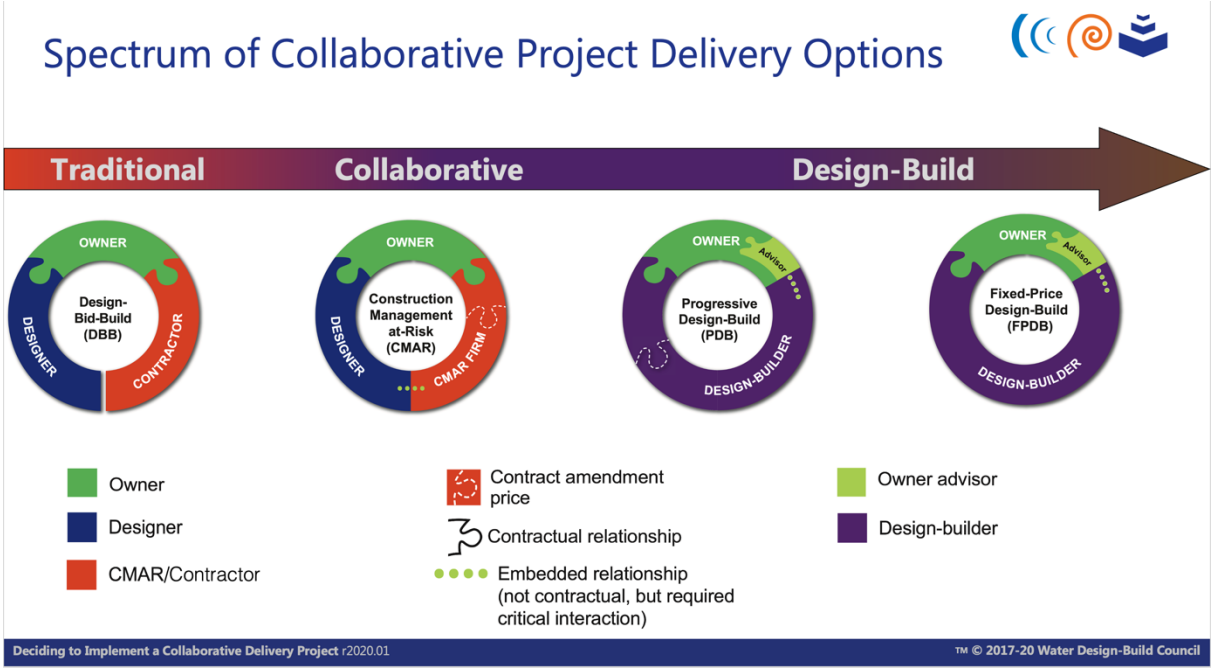


Figure 1. Potential Project Delivery Methods Spectrum Considered for the City of Bellingham
(Graphics credit: Water and Wastewater Design-Build Handbook, 5th Edition, permission for use under terms of Brown and Caldwell's WDBC Membership)

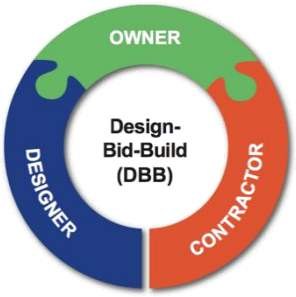
Each of the traditional and collaborative project delivery methods has its own attributes that generally differ in terms of allocation of risks and responsibilities, scheduling and schedule certainty, ownership, performance guarantees, and procurement complexity. In practice, the City may opt for a combination of delivery methods across various components of its Project. While multiple construction packages were discussed, this analysis is focused on one construction package for the Project. If the City elects to implement the program with separate project packages, a separate delivery method consideration should be given to each package.

2.1.2 Design-Bid-Build

Design-Bid-Build (DBB) has historically been the most common approach to development of public infrastructure projects. The DBB process has also been used extensively by the private sector to procure new facilities. DBB is considered the "baseline" contract delivery model.

A typical DBB project involves the Owner engaging one or more engineering firms to develop detailed plans and specifications and to assist with obtaining local, state, and federal approvals for the project, as required. The Owner then uses the detailed plans and specifications package as part of a tender package to obtain bids from Contractors. The Contractor selected through the bidding process is subsequently engaged to construct the facility in accordance with plans and specifications provided by the Owner for its as-bid price and schedule. The as-bid price may be lump sum for the entire project, lump sum for specific bid items, or unit price. Typically, the Contractor is paid monthly progress payments, and the Owner applies holdbacks on payments in accordance with governing state or local law.

A typical DBB project schedule consists of completing the design and permitting prior to construction bidding. This sequence often results in a longer overall delivery schedule, but it also reduces exposing the Owner to capital and schedule risks resulting from permitting delays or unexpected changes in permit conditions.



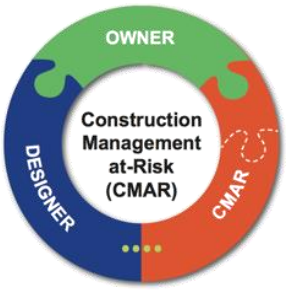
Roles in a DBB project are normally very clearly defined. Project definition, site acquisition, and project integration is retained by the City. Responsibility for design performed to meet the Standard of Care lies with the Engineer. Construction and scheduling risks lie with the Contractor, and the Contractor is responsible for building the project as defined in the plans and specifications. Operations and maintenance risk rests with the City. However, operators often do not – and Contractors do not – have significant input into the design, which can contribute to change orders. Change orders and claims during construction are common, and the requirement for some re-design during construction exists, typically at the Owner's cost. In addition, project performance (i.e., achieving specified performance outcomes) and/or lifecycle responsibility and risk are not typically transferable using DBB delivery. This is because the Contractor is only responsible for constructing the project as designed, not for meeting intended performance.

Advantages to Bellingham	Disadvantages to Bellingham
• Well understood and time-tested process and procedures • Provides significant control by Owner over design as Owner involved through final design • Ability to select consultants by qualifications and cost in the traditional manner. Professional firms limited to Standard of Care for design • Contactor typically selected on low bid. In some circumstances, Owners have the ability to consider past performance via a pre-qualifications process, but the ultimate selection is based on low bid. Construction bids are made to full plans and specifications • Full construction price known at bid time • Fully accepted and viable under applicable procurement statutes	• Linear process takes time • Designer/Contractor collaboration limited to evaluation of bid alternatives and change order negotiations, requests for information, and performance verification during construction • Initially-designed solution may not reflect best potential construction technologies or Contractor's best practices • Relies on Engineer's estimates until bids are received from Contractors • Bids are subject to design omissions and resulting change orders • No opportunity to select Contractor primarily on qualifications and past performance in lieu of low bid price • Separate contracts for design and construction creates multiple points of contact for Owner, and who must then take responsibility for resolving competing interests • Does not inherently allow performance risk transfer - design obligation is traditional "Standard of Care," and construction obligation is to build according to the specified contract documents • Not readily conducive to integration of a lifecycle evaluation component or a performance-based operations commitment

Note that this summary of advantages and disadvantages represents a general industry consensus, but local practice may differ, and project-specific exceptions are common.

2.2 General Contractor/Construction Manager (GC/CM)

General Contractor/Construction Manager (GC/CM) is also considered a traditional delivery model, albeit a value-added approach where an intentional schedule overlap is created between the Engineer and the Contractor, allowing the Contractor to bring construction insight to bear as early as practical in the design process. Sometimes referred to as "design-build-light," this methodology maintains two separate contracts between the City and the Design and GC/CM firms, similar to DBB, but encourages collaboration during design to reduce risk once the Contractor proceeds to construction in the field. GC/CM is very similar to Construction Management at-Risk (CMAR), which is the term used by the WDBC as illustrated in the accompanying graphics.



While procurement processes for the Engineer or Designer is based on traditional professional services criteria, the selection of the Contractor is largely qualifications-based, without any hard bid of the construction cost (although construction fees, or mark-ups on construction cost are often used as a price-related selection criterion). The ultimate construction cost is developed during the design period, typically in an open-book fashion, and ultimately agreed upon as a "Guaranteed Price" (GP), which is then implemented "maximum allowable construction cost" basis in Washington State prior to authorizing the start of construction.

Where agreement on a GP cannot be reached, or when subcontracted construction pricing competitiveness cannot be verified, Owners often maintain the option to convert the construction scope to a hard-bid process, commonly known as the contractual "off-ramp."

While promoting collaboration early in the design process, the formal contract vehicles consisting of separate agreements between the Owner and Engineer and the Owner and Contractor are essentially unchanged compared to traditional DBB delivery but with the construction cost and price development methodology contractually defined as described above. During construction delivery, traditional practices for managing Contractor change orders, requests for information (RFIs) from the Designer, and verification of construction performance remain unchanged.

Advantages to Bellingham	Disadvantages to Bellingham
• Relies on proven, accepted method for selecting professional engineering services based on qualifications • Integrates constructability early in the design process • Provides Contractor-led estimates earlier and allows scope revision during design to meet project budget • Can reduce overall project risk and contingency • Can reduce design misunderstandings and resulting potential for change orders • Allows qualifications and past performance to be considered when selecting a Contractor along with consideration of certain price information (i.e., percent fee) • Allows permitting process to be better integrated into design and construction planning	• Relies on Engineer's estimate for initial cost characterization • Creates a "forced arrangement" between Designer and Contractor that may – or may not – work • Final construction scope still subject to change order potential • Added cost to Owner for Contractor's pre-construction phase services (although may be offset with construction savings due to early collaboration) • Requires selection of Contractor based on qualifications without knowing full construction price • Separate contracts for design and construction creates multiple points of contact for Owner, and who must then take responsibility for resolving competing interests • Does not inherently allow or support performance risk transfer - design obligation is traditional "Standard of Care," and construction obligation is to build according to the specified design • Not as readily conducive to integration of a lifecycle approach or a performance-based operations commitment

Note that this summary of advantages and disadvantages represents a general industry consensus, but local practice may differ, and project-specific exceptions are common.

2.3 Design Build

Under a DB structure, the Owner enters into a single contract with a single DB entity or a consortium of entities acting together as one entity (e.g., a Joint Venture). Generally, the DB Contractor has the responsibility of designing and building a project that meets Owner-prescribed performance standards, and the Owner then pays the DB entity based on certain construction and performance milestones being achieved. While not relevant to the City's Project, easement acquisition scope may also be assigned to the Design-Builder.

In practice, DB can be procured using several different methods, tailored to meet procurement statutes, to align with project complexity, and the level of design completion anticipated prior to the procurement (often referred to as an "indicative design or "bridging documents"). Design-Build models also support performance risk transfer for both design and construction via extended acceptance testing and commissioning scope. O&M and lifecycle considerations may also be integrated into Design-Build delivery (albeit not to the extent of the Design-Build-Operate [DBO] method, which was not evaluated for the City in this case).

The various forms of DB differ largely on when pricing is requested of proposers and to the degree design definition is developed in advance of the DB procurement and subsequently provided to the Design-Builder as part of a request for qualifications (RFQ)/request for proposals (RFP). Two Design-Build methods were considered for the City:

1.3.1 Progressive Design-Build (PDB)

In a Progressive Design-Build (PDB) procurement, a Design-Builder is selected based on qualifications, generally similar to the GC/CM model. However, under a single contract PDB model, the Design-Builder develops the design and construction cost estimate in progressive steps, often in conjunction with the 30- and 60-percent levels of design detail. Once the design is advanced to the satisfaction of the City (sometimes as early as 30 percent, often 60 percent and sometimes up to 90 percent), a Guaranteed Price (GP) is defined for approval by the Owner. (As with GC/CM, the GP can be converted to a GMP or LS for actual delivery of the construction phase.)

If the Design-Builder and the Owner cannot reach agreement on an acceptable GP, the Owner can use the completed design as the basis for a hard construction bid procurement. In this case, an "off-ramp" occurs, and the project is transitioned to DBB (or, less often, a FPDB), which will likely impact schedule.

Progressive DB is often preferred over FPDB when a project lacks definition or where permitting scope is best left to Designer of Record (instead of completed as part of a design criteria package to accompany a FPDB RFP), or when an Owner prefers to remain involved in the design process. PDB is often preferred over DBB to leveraging the schedule, collaboration, risk transfer, and contractual advantages provided by a DB approach, while retaining more traditional Owner hands-on engagement in the design process. PDB is also valuable when regulatory permitting or funding sources require well-developed design solutions, or when an Owner believes it can lower cost by participating in design decisions and in managing risk progressively through the project definition phase.

Owners do not generally use the progressive procurement method when a project's definition, including permitting, is well advanced prior to the procurement or when a fixed construction price is preferred (or required) to select a Design-Builder.

Advantages to Bellingham	Disadvantages to Bellingham
• Single contract with and point of accountability to the Owner • Maximum control under a single contract - over project design, construction, and O&M lifecycle costs because final contract is not signed until a significant portion of the design is complete • Single-phase, straightforward (i.e., inexpensive) procurement process that can be completed in short timeframe, with qualifications-based and pricing criteria • Increased competition (i.e., increased marketplace interest) due to relatively low proposal preparation cost and best value (qualifications, past experience and certain pricing information)- selection • Provides a single-entity team with aligned interests for project success • Provides progressively detailed, Contractor-based estimates of total project costs from earliest point in project through GP definition • Provides maximum opportunity for design and construction functions of the Design-Builder and Owner to collaborate to define scope, define the project to meet schedule and budget (sometimes referred to as "design to budget"), and tailor subcontracting plan • Provides on "off-ramp" to hard-bid construction if GP is not competitive or cannot be agreed upon. • Can substantially reduce Design-Builder-initiated change orders • Can be implemented with expected pre-design level currently being prepared for the Project • Provides Owner the opportunity to transfer performance risk that exceeds the inherent limitations of Standard of Care and traditional construction contracts	• Requires selection based on qualifications; fees not known until negotiation and full construction cost not known until GP • May not be as fast to deliver as FPDB due to potential for extended design/estimate development period, including involvement of numerous stakeholders in the design process • May not be perceived as being "competitive" for construction pricing • Requires significant Owner staff involvement and resources during design • May limit local/small Engineer participation due to at-risk nature of the work and typical teaming with a Contractor
Note that this summary of advantages and disadvantages represents a general industry consensus, but local practice may differ, and project-specific exceptions are common.	

In a PDB procurement, the RFQ/RFP typically includes an Owner's conceptual or preliminary designs to illustrate project viability, permitting constraints, and desired features. Recommended best practice is to provide the Design-Builder with flexibility in proposing improved configurations and alternatives to these concepts during the procurement process and during the design phase. Prescriptive elements of the pre-design should generally be minimized.

1.3.2 Fixed Price Design-Build (FPDB)

In a fixed price Design-Build Procurement, the RFQ/RFP generally includes around a 30 percent preliminary design (sometimes referred to as an indicative design or "bridging" design). This level of pre-design may vary greatly from project-to-project and among various technical disciplines. Requirements for a performance-based approach are stated as measurable performance objectives of the completed project rather than specific approaches, treatment processes, or specifications that the Design-Builder is required to apply. For a prescriptive approach, the pre-design documents are required parameters to which the Design-Builder must largely comply.

FPDB is often considered as a highly competitive contract delivery model given its industry-recognized success in supporting large, complex projects. A performance-based procurement gives a Design-Builder the flexibility to propose how they will meet the City's objectives, while requiring proposers to provide a lump sum, fixed price for completion of the Project. Except for explicitly approved Owner changes, the Design-Builder must conform to their originally proposed price (except for unforeseen conditions and Owner-directed changes).

Performance-based procurements are often preferred when an Owner has a clear vision for how a facility must perform, has limited resources, limited time, or limited interest in the specific method for achieving required performance. This model is used to prompt industry's most innovative and cost-effective solutions through what is essentially a design competition, typically in combination with a need to accelerate schedule. Conversely, as Owner requirements come to light after selection, the Owner-directed change is likely to be additive to the origial fixed price proposal.

Advantages to Bellingham	Disadvantages to Bellingham
• Maximum potential for Design-Build cost savings through design innovation during competitive procurement • Maximum transfer of design-related performance risk to Design-Builder • Perceived as "competitive" construction pricing, providing full contract cost at time of proposal • Allows selection of Design-Builder based on past performance, qualifications, and ability to work as a single-entity with aligned interests for project success • Can substantially eliminate Design-Builder-initiated change orders (except for unforeseen conditions) • Provides a performance risk transfer mechanism • Single contract with and point of accountability to the Owner	• If lifecycle cost is not analyzed or operations impact not included in scope, may result in higher O&M costs or undesirable or low-quality project features • Depending on Owner's preferences, may entail development of approximately 30 percent design (may vary) prior to procurement (which may or may not be prescriptive) or Owner may select a less prescriptive approach where outcomes (performance), design criteria, and minimum technical requirements (i.e., scope, quality) are specified • Proposal evaluation and selection is relatively complex • Limited ability to predict what will ultimately be proposed • Fixed-price pricing may include excess risk and contingency cost due to under-defined project scope • Limited opportunity for Owner and Design-Builder collaboration on design during procurement process • Limited ability for Owner to adjust proposed design, scope without resulting in Owner-initiated change orders and resulting price adjustments. • May limit local/small subconsultant participation due to at-risk nature of the work
Note that this summary of advantages and disadvantages represents a general industry consensus, but local practice may differ, and project-specific exceptions are common.	

More prescriptive procurements are often preferred when Owners are very clear on their preferences and want to use Design-Build to accelerate the schedule while allowing selection of a Design-Builder based on a combination of qualifications and a fixed price. While a Design-Builder may offer a variation or alternative concept to the bridging documents, procurement procedures are often established to require review and approval of these exceptions or "alternative technical concepts" in advance of the proposal submittal. With this method, the lump sum price in the Design-Builder's proposal is only adjusted for specific Owner-initiated scope changes, generally due to unforeseen conditions or a change in law or regulatory practice.

Section 3: Workshops and Outcomes

Three workshops were held with City staff and Brown and Caldwell in support of this delivery method analysis. The on-line workshops were held with the objectives of understanding: the City's overall Project objectives and success factors; previous experience with collaborative delivery methods; risk allocation; and other variables, such as administrative familiarity and required City resources, that might inform a delivery method recommendation.

The three workshops are summarized below.

3.1 Workshop 1 – Project Drivers (March 24, 2021)

Workshop 1 consisted of a free-form discussion (no prepared slide materials) with City participants to identify key Project drivers, informally rank them, and ultimately form a working definition of Project success. Specific delivery models were not the focus of this workshop, but the City's past positive experience with GC/CM was discussed as a relevant criterion for future consideration. However, aside from assessing past GC/CM experience, the discussion was generally "delivery method agnostic."

In summary, the following overall Project drivers were summarized as an outcome of this discussion with City staff:

1. Focus on operational priorities and impacts:
   a) Address operational objectives during design
   b) Include lifecycle emphasis during pricing and decision-making
   c) Maintain operations during construction
2. Maintain a high level of City "touch" during design process (e.g., input, influence, and City control of design details):
   a) High Touch: prescriptive requirements to reflect known preferences
   b) Risk Avoidance: proven technology for primary process components
   c) Lower Touch: "other scope" (e.g., scope unrelated to core treatment process that can be provided by others with minimal input or risk to the City)
3. Risk: the City is willing to "buy risk down" (e.g., mitigate risk early in the project through detailed planning and robust design choices)
4. Cost: early certainty is preferred; however, "best value" is a meaningful concept in lieu of only a low capital cost criterion
5. Schedule: take the time to do things "right" (e.g., spend time planning and preparing to avoid schedule delays later)

These goals and insights were used to populate the next workshop's discussion regarding procurement strategy and desired outcomes, and to assess delivery methods based on the City's "comfort zones" for subjects such as shifting risk and retaining control of design detail.

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3.2 Workshop 2 - Implementing Collaborative Delivery (March 31, 2021)

The second workshop addressed the agenda shown in Figure 2 and Attachment A, reviewing the critical success factors that were identified in the prior workshop, articulating the need for a Project strategy related to procurement and the selection of delivery methods; discussed risk transfer and the concept of "comfort zones" relative to the City's desire and willingness to deliver under various collaborative delivery formats; and a detailed walk-through of each delivery model, including its strengths and weakness. This workshop used slides based on WDBC material and was hosted via an on-line session.

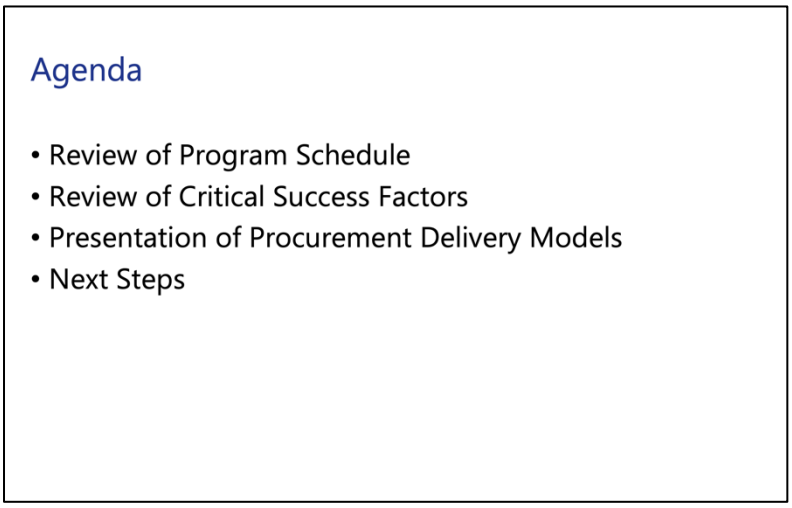

Figure 2. Workshop 2 Agenda

Based on the critical success factors identified in the first workshop, four issues were highlighted in this workshop to illustrate the concept of "comfort zones" and make a preliminary assessment of delivery method compatibility:

- Touch What You Know
  A high degree of City input is desired on core treatment process components; less hands-on touch is needed for project components that are either unfamiliar or less critical from the City's perspective.
- Early Price Certainty
  Knowing the capital cost as early as feasible in the design process is important to the City.
- Take Time to Do it Right
  A delivery implementation that allows time and consideration for critical decisions is valuable to the City; "rushed" or uniformed decision-making is to be avoided.
- "Tried – True" Avoids Risk
  The City is not interested in unproven or "leading edge" technology for core treatment processes; there is room for more innovation for ancillary project components that are not seen as being as critical.

BC presented a preliminary assessment of the City's potential prioritization of these issues relative to each other, and for each issue, a preliminary assessment of each delivery method's potential strengths, weakness, and overall potential applicability to the Project. The merits of applying one or more delivery methods to specific elements of the Project was discussed separately. These issues' prioritization and weighing relative to delivery methods was adjusted based on group input and consensus. Figure 3 shows the outcome of the workshop discussion, after issues were reprioritized and ranked with input from the attendees.

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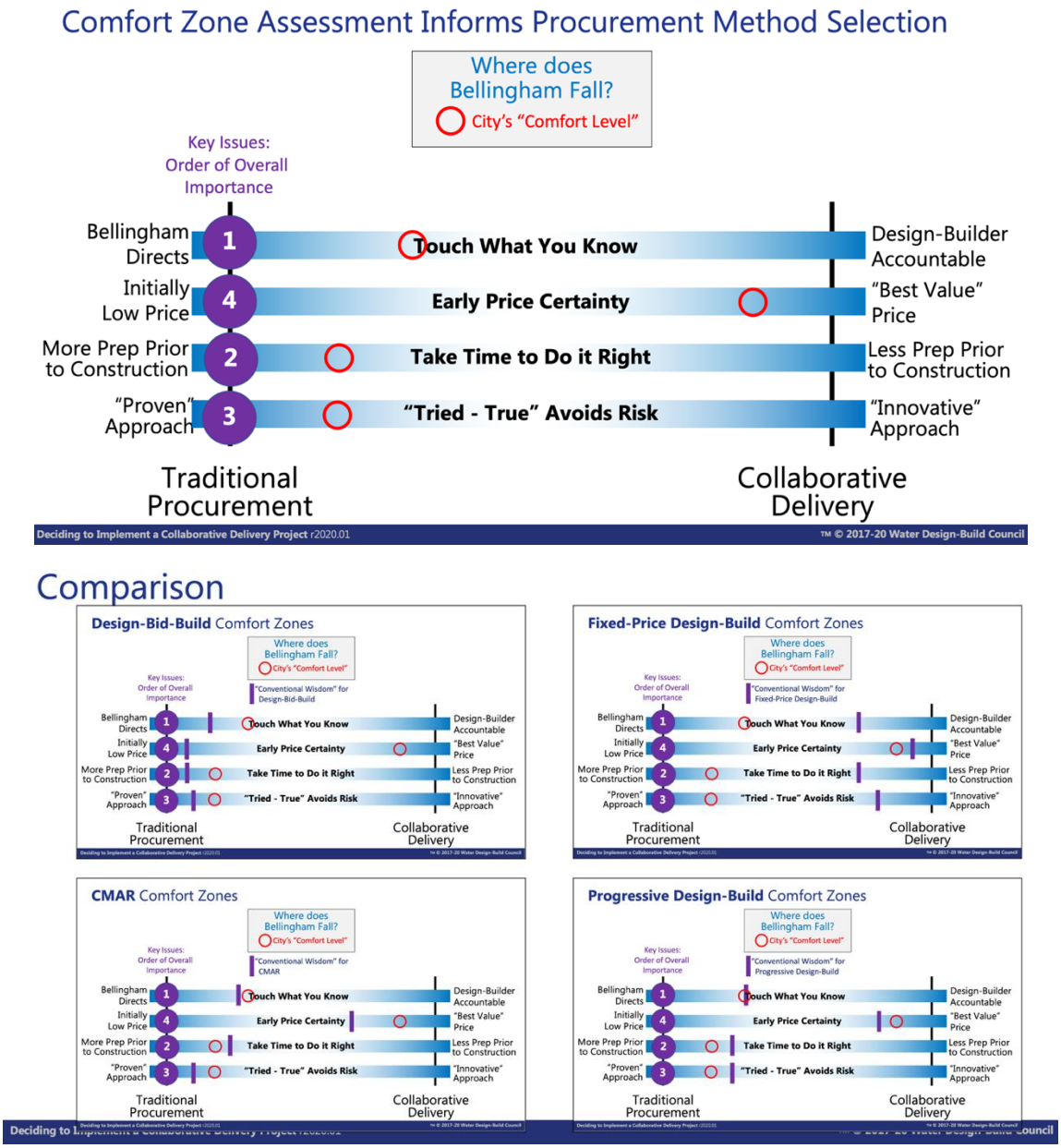

Figure 3. Comfort Zone Assessment

Top Slide: Preliminary Alignment of Key Issues and Delivery Methods for the Program (as revised during Workshop 2)

Bottom Slide: Alignment of City's Key Issues Against the "Conventional Wisdom" Regarding the Four Delivery Methods Under Consideration

(CMAR [GC/CM] and PDB demonstrating the best alignment to the City's "Comfort Zones")

The ranking of the four delivery methods against City objectives, based on "conventional wisdom" of each methods relative attributes is illustrated on the bottom slide of Figure 3.

Based on this assessment, a preliminary recommendation from this workshop was to consider downgrading (or eliminating) FPDB from further consideration because it does not address the City's desire for high-touch portions of the design process, upfront planning and risk mitigation, as well as the likelihood that an unproven technology perceived as "too far ahead of us" might be offered through the FPDB "design competition" process.

In addition, DBB delivery was not considered a viable option due to the complexities of the Project and the City's desire to use a collaborative delivery method, either GC/CM or PDB.

On the positive side, both GC/CM and PDB were identified as viable potential delivery methods based on their attributes of:

- Selection on qualifications and best value
- High Owner engagement for planning and in critical design decisions
- Earlier price certainty relative to traditional delivery

Based on discussion after presentation of the workshop materials, a primary disadvantage of PDB at this point was identified as the City's unfamiliarity with PDB-specific procurement procedures and contract templates (as compared to GC/CM, which the City has used successfully in the past).

3.3 Workshop 3 – Risk, Detailed Scoring, and Preliminary Recommendations (May 4, 2021)

The third workshop addressed the agenda shown in Figure 4 and Attachment B, consisting of a review of the Project schedule and critical success factors, followed by further details of the GC/CM and PDB delivery models. The schedule that was used to underpin the delivery method analyses is shown in Figure 5. The initial portion of the discussion focused on how risk can be assessed and allocated and how risk allocation is fundamentally different for traditional (DBB and GC/CM) projects under a Standard of Care versus a Design-Build (PDB and FPDB) model.

The follow-on to Workshop 3 included a more detailed assessment of the delivery models using "heat maps" (Figure 6). This assessment was discussed with City participants, and minor adjustments were made to the assessment as a result of the discussion. Key issues were grouped by both overall importance and priority to the City, as well as according to how much the delivery method might ultimately impact or influence success on any given priority.

The outcome of the workshop was a recommendation to the City by BC to use either GC/CM or PDB, based on the City assessment of two key factors:

1. Does the added ability to transfer treatment performance and other project-related risks (e.g., scope gaps or design omissions) beyond Standard of Care provide meaningful value to the City?
2. Does the above risk transfer offset the added "administrative friction" that results from implementing a DB procurement and contract (noting that the City has not previously used PDB, in contrast to GC/CM, where the City has familiarity and an existing contract template)?

The workshop concluded with identifying two follow-on tasks:

1. Seek to provide the City with peer-to-peer references where both GC/CM (CMAR) have been used by the same Owner, as a means for the City to gain firsthand insight to the two potential delivery methods, side-by-side.
2. Draft this TM with any further refinements in the recommendation. (As discussed in the following section.)

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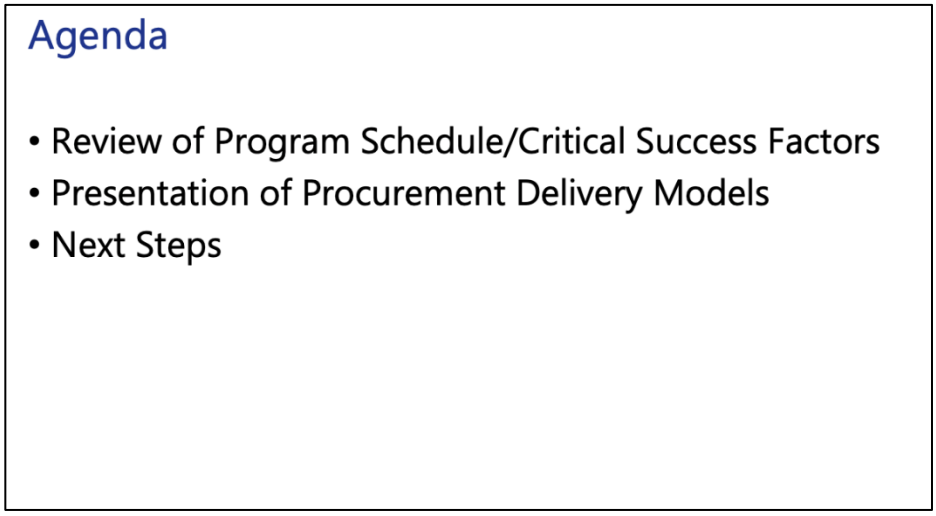

Figure 4. Workshop 3 Agenda

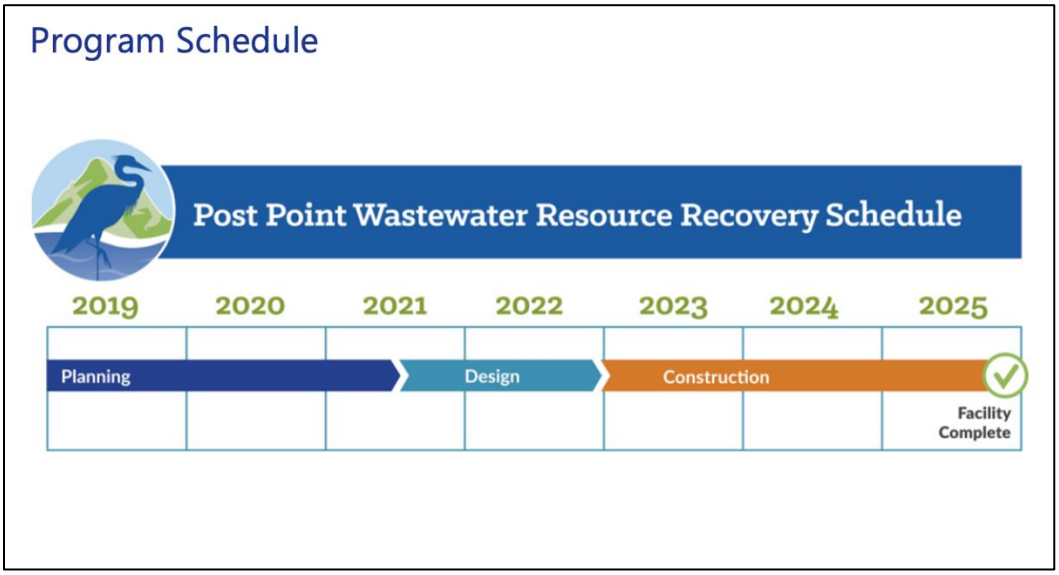

Figure 5. Program Schedule Assumed for Delivery Model Analyses

Delivery Method Ranking Heat Map

Delivery Method Key Selection Criteria	Relative Importance to Bellingham	Design-Bid-Build Favorability	CMAR Favorability	Progressive DB Favorability	Fixed-Price DB Favorability
Potential Risk Transfer Benefits may HIGHLY Impact Delivery Method Selection					
***Ability* to transfer performance risk**		Very UNfavorable	UNfavorable	Favorable	Very Favorable
Relative *value* of risk transfer for SOLIDS	[LOW-MED]	Equipment warranty only	Extended warranty	Performance guarantee with LDs	Performance guarantee with LDs
Relative *value* of risk transfer for BIOGAS	[MED-HIGH]	Equipment warranty only	Extended warranty	Performance guarantee with LDs	Performance guarantee with LDs
Project-Specific Criteria HIGHLY Impacted by Delivery Model Selection					
Touch What You Know (City input/decisions on critical design/scope)	HIGH	Traditional design direction/interaction	Traditional design direction with contractor input	Collaborative interaction: City with design-builder	Design criteria set at RFP phase
Early Price Certainty (Set a realistic budget early, and stick to it)	HIGH	Price known after 100% design and bid, then subject to COs	Price known at 60% design, subject to GMP+COs	Price known at 60% design, subject to GMP	Price known at proposal, Very limited COs
Take Time to Do it Right (Go slower to get things set up well, and then go faster)	HIGH	Linear process takes too much time; limited collaboration	Phase 1 collaboration	Phase 1 collaboration	Heavy lift prior to RFP; some interaction during proposal
"Tried - True" Avoids Risk (Require proven technology for critical scope)	HIGH	City gets what it prescribes	City gets what it prescribes, with construction input	City gets what it prescribes, with DB collaboration	City prescribes performance specification, gets what it gets
Any Other Critical Issue(s) (Fill in for individual concerns)	?				
Other Criteria that COULD be Impacted by Delivery Model Selection					
WIFIA and Other Funding Considerations	MED	Long lead time to project shovel in the ground	Supports early application	Very integrated approach, supports application process	Earliest to be be shovel-ready
New/Complex Procurement Method	MED	Very familiar to City	Familiar to City	New to City, but similar to CMAR	Completely new procurement and contracting process
Market Acceptance/Interest	HIGH	Least popular method for quality contractors in W/WW	High interest from both engineers and contractors	High interest from both engineers and contractors	Limited interest in a busy market, high cost to propose

Figure 6. Detailed Assessment of Delivery Methods (as revised during Workshop 3)

Section 3: Post-Workshop Discussions and Recommendations

Subsequent to the third workshop, BC offers the following refined criteria to inform the City's selection:

Choose GC/CM If....	Choose PDB If...
Continuity with existing Design Team is of value (for funding and technical considerations)	A single point of design and construction accountability is desired
Application and understanding of existing (successful) City GC/CM procurement process is of value	Implementation of a new procurement process and delivery method is an acceptable risk
Certainty in applying a proven core treatment process design is of value	Potential innovation or "fresh eyes" on treatment process approach is of value
There is perception of little meaningful risk to transfer for the ultimate treatment process performance	A treatment process performance or other forms of performance guarantees (e.g., design gaps or omissions or "fit for purpose") is valuable

These criteria represent a summary of the significant differences between GC/CM and PDB to consider as the City makes its delivery method decision. In short, if the City is committed to establish a PDB procurement process and committing the resources to support the PDB Phase 1 design process, PDB has the edge. If the City's resources are constrained, then the familiarity of the GC/CM process and the more traditional design implementation points toward a GC/CM decision.

An additional input that was discussed subsequent to the workshops was level of market interest. Based on the views of various potential Designers and Contractors who reached out to the City about the Project, there are two perspectives to consider for both GC/CM and PDB:

- GC/CM will attract stand-alone Contractors, both regionally and nationally, without the need for engaging a separate engineering firm as part of a team.
  This approach requires less lead time for teaming and may attract a greater number of interested parties familiar with GC/CM commonly used in Washington. However, GC/CM is not likely to attract integrated Design-Build firms that favor an integrated DB approach and that do not typically propose on CMAR projects without a design component.
- PDB will require formation of Design-Build teams (e.g., aligning Engineers and Contractors under a single entity), in addition to potentially attracting "integrated" Design-Builders that are engaged in the City's geographic market.
  This approach requires a bit more advance notice for quality teams to form, and potentially fewer "pairings" will participate, but will more likely attract larger "integrated" Design-Builders that are comfortable with providing a single point of accountability with contractual performance guarantees for treatment process related performance and/or for scope gaps and fitness of purpose.

While initial market feedback points to a PDB preference, market interest is likely strong for both methodologies, but may be best verified with further market and peer-agency outreach as other Owners' experience in procuring both GC/CM (CMAR) and PDB projects can provide additional valuable insight.

Procurement schedules for both GC/CM and PDB would be relatively similar, with an estimated additional 1-2 months for PDB as the City would need to prepare RFP front ends and a contract for that methodology. Additionally, for either method, some municipalities procure an Owner Advisor separate from the Pre-Design Engineer, while others incorporate the Owner Advisor role into the Pre-Design Engineer.

In summary, both GC/CM and PDB implementations would serve the City well. However, the City's past positive experience with GC/CM and the certainty of applying proven treatment process design points to a GC/CM delivery methodology for the Project.

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Attachment A: Delivery Model Analysis Workshop 2: Comfort Zones

Brown AND Caldwell

Bellingham, Washington

Delivery Model Analysis Workshop 2: Comfort Zones

City of Bellingham WASHINGTON

March 31, 2021

Deciding to Implement a Collaborative Delivery Project r2020.01

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Agenda

- Review of Program Schedule
- Review of Critical Success Factors
- Presentation of Procurement Delivery Models
- Next Steps

2

Program Schedule

3

Critical Success Factors – Key Takeaways

1. Focus on operational priorities and impacts:
   a) Addressing operational objectives during design
   b) Lifecycle emphasis and pricing and decision-making
   c) Maintaining operations during construction
2. Level of "Touch" during design process:
   a) High Touch: Prescriptive requirements to reflect known preferences (City)
   b) Risk Avoidance: Proven technology for primary process components (BC)
   c) Lower Touch: "Other stuff" (Others)
3. Risk: willing to "buy it down"
4. Cost: early certainty preferred, "best value" means something
5. Schedule: take the time to do things "right"

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A non-profit educational association established in 2005.
Purpose: to help owners and industry practitioners understand the best practices for use in design-build delivery methods for the water and wastewater infrastructure.
Income is solely dedicated to research, education and outreach.

Mission

To evolve best practices for successful implementation of water projects through collaborative-delivery methods by facilitating thought leadership with stakeholders through research, education, and communication.

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WDBC Education Platform

- Original Research
- *Water and Wastewater Design-Build Handbook, Fifth Edition*
- Procurement Guides
  - CMAR
  - Progressive Design-Build (PDB)
  - Fixed-Price Design Build (FPDB)
- Publications and Blogs
- Partnerships
  - AWWA/WEF/NACWA
  - DBIA Best Practices
  - W/WW Specialty Conference
  - PDB Contract Document

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Deciding to Implement a Collaborative Delivery Project

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Deciding to Implement: Key Concepts

- **Structuring an approach choose the right delivery model**
  - Strategy
  - Tactics
  - Implementation
- **Reflecting project priorities**
- **Assessing Bellingham's design-build *Comfort Zones***

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Structuring An Approach Choose A Delivery Model

PROJECT
STRATEGY
CHECKLIST

- Statutory and Regulatory Requirements
- Permitting and Technical Requirements
- Funding Considerations
- Key Project Drivers
- Define Project Objectives
- Using an Owner Advisor

Project success
Strategy with a
defined delivery approach

- What can you – or can't – you do in your geography?
- What's the best approach for your specific project?
- What needs to happen prior to a procurement?

Outcome = Best Possible Project

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Structuring An Approach Choose A Delivery Model

PROJECT
STRATEGY
CHECKLIST

- Statutory and Regulatory Requirements
- Permitting and Technical Requirements
- Funding Considerations
- Key Project Drivers
- Define Project Objectives
- Using an Owner Advisor

PROJECT SPECIFICATION
TACTICS
CHECKLIST

- Technical Criteria and Scope
- Define the Procurement Process
- Financial and Commercial Requirements
- Legal Advice and Form of Contract
- Risk and Opportunity Assessment

Procurement strategy
Tactics that result
in a successful Award

- How much design needs to be done?
- How do we evaluate qualifications and proposals?
- How do we select a contract and evaluate financials?

Outcome = Best Possible Project

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Structuring An Approach Choose A delivery Model

PRO
STRA
CHE

- Statutory an Requirement
- Permitting a Requirement
- Funding Considerations
- Key Project Drivers
- Define Project Objectives
- Using an Owner Advisor

Project
Implementation
that reflects your vision for success

- What happens after Award?
- What do we need to do organizationally to prepare and deliver?

Requirements

- Legal Advice and Form of Contract
- Risk and Opportunity Assessment

PROJECT
IMPLEMENTATION
CHECKLIST

- Organizational Capacity
- Project Implementation Plan
- Scope During Construction

Outcome = Best Possible Project

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PROJECT
STRATEGY
CHECKLIST

Statutory and Regulatory Requirements
- Understand state and local statutes
- Apply procurement regulations and policies
- Understand market precedent

Permitting and Technical Requirements
- Accommodate permitting constraints
- Balance innovation and prescription
- Define project location and scope

Funding Considerations
- Define/obtain funding/ financing options
- Understand market capacity/ risk tolerance
- Apply cash-flow constraints

Key Project Drivers
- Control and share risk
- Define "cost" and its importance
- Identify the importance of schedule
- Recognize the value of innovation
- Identify/address key stakeholders
- Assess operational impacts

Define Project Objectives
- Align to delivery models
- Optimize risk allocation
- Establish metrics for success

Consider
- Conducting a Market Sounding
- Developing a preliminary risk assessment

Using an Owner Advisor
- Determine need
- Define technical scope
- Define role and responsibilities

PROJECT
SPECIFICATIONS
TACTICS
CHECKLIST

Technical Criteria and Scope
- Refine scope and project definition
- Define specifications and requirements
- Refine performance and prescription balance
- Create "bridging" documents (only as required)
- Identify technology/design constraints and create opportunities for innovation

Define the Procurement Process
- Create 1- or 2-phase RFQ/RFP documents
- Define evaluation priorities and methodology
- Develop evaluation criteria and process
- Establish milestones and schedule
- Plan for market orientation and engagement

Financial and Commercial Requirements
- Establish budget and contingency approach
- Define required financial capacity and security
- Calculate potential damages and incentives
- Develop payment mechanism and criteria
- Establish insurance requirements

Legal Advice and Form of Contract
- Engage legal counsel
- Select and tailor form of contract
- Iterate the contract with the market

Risk and Opportunity Assessment
- Identify, assess, manage, and assign risk and opportunity in support of all the above

PROJECT
IMPLEMENTATION
CHECKLIST

Organizational Capacity
- Owner level of involvement
- Leadership knowledge
- Staff knowledge
- Technical resources
- Definition of roles
- Augmentation of resources

Project Implementation Plan
- Organizational preparation
- Procurement preparation
- Implementation

Scope During Construction
- Provide field support and inspection
- Provide required third-party testing
- Cost monitoring
- Contract compliance monitoring
- Support quality and safety programs

e Project

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Identifying Project Priorities: What Are The Key Topics?

Issue: Schedule
How can the procurement process be varied if schedule is critical?

Issue: Design Effort
How much pre-design is required to ensure you get what you want (versus performance specifications)?

Issue: Design Approvals
How much oversight of design should you have?

Issue: Risk Sharing
How are risks best shared?

Issue: Price
How do you evaluate proposals beyond price?
Does low price always win?

Issue: Selection Criteria
What criteria are important to success?
What's the best indicator of future performance?

Issue: Scope
What elements of the projects should be DB versus traditional delivery?

Issue: Innovation
How do you ensure innovation and quality?

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Identifying Project Priorities : What Are The Key Topics?

Issue: Schedule
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What elements of the projects should be DB versus traditional delivery?

KEY PROJECT PRIORITIES

SCHEDULE
How can the procurement process be varied if schedule is critical?

SELECTION CRITERIA
What criteria are important to success?
What's the best indicator of future performance?

DESIGN EFFORT
How much pre-design is required to ensure you get what you want (versus performance specifications)?

PRICE
How do you evaluate proposals beyond price?
Does low price always win?

SCOPE
What elements of the project should be DB versus traditional delivery?

DESIGN APPROVALS
How much oversight of design should you have?

RISK SHARING
How are risks best shared?

QUALITY
How do you ensure innovation and quality?

Issue: Design Approvals
How much oversight of design should you have?

Issue: Price
How do you evaluate proposals beyond price?
Does low price always win?

Issue: Innovation
How do you ensure innovation and quality?

KEY PROJECT DRIVERS

- CONTROL/RISK SHARING
- COST
- SCHEDULE
- INNOVATION

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Identifying Project Priorities: Consolidating Key Project Drivers

KEY PROJECT PRIORITIES

SCHEDULE
How can the procurement process be varied if schedule is critical?

SELECTION CRITERIA
What criteria are important to success?
What's the best indicator of future performance?

DESIGN EFFORT
How much pre-design is required to ensure you get what you want (versus performance specifications)?

PRICE
How do you evaluate proposals beyond price?
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What elements of the project should be DB versus traditional delivery?

DESIGN APPROVALS
How much oversight of design should you have?

RISK SHARING
How are risks best shared?

QUALITY
How do you ensure innovation and quality?

KEY PROJECT DRIVERS

- CONTROL/RISK SHARING
- COST
- SCHEDULE
- INNOVATION

- Touch What You Know
- Early Price Certainty
- Take Time to Do it Right
- "Tried - True" Avoids Risk

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Identifying Project Priorities: Project Delivery "Comfort Zones"

Bellingham Critical Success Factors

Post Point Priorities?

1. Touch What You Know
2. Early Price Certainty
3. Take Time to Do it Right
4. "Tried - True" Avoids Risk

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Comfort Zone: Avoiding Stakeholder Surprises

?

- Touch What You Know
- Early Price Certainty
- Take Time to Do it Right
- "Tried - True" Avoids Risk

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Comfort Zone: Avoiding Stakeholder Surprises

Bellingham maintains control...
and keeps most of the risk
result:
***Bellingham directs* a solution**

?

DB firm assumes some control...
and shares risk via KPIs
result :
***Bellingham delegates* a solution**

Bellingham Directs — **Touch What You Know** — **Design-Builder Accountable**

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Comfort Zone: Meeting the State Budget

?

Touch What You Know
Early Price Certainty
Take Time to Do it Right
"Tried - True" Avoids Risk

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Comfort Zone: Meeting the Stated Budget

Fixed design fees and
low-bid contracting
result:
**Potential lower first price,
later change potential**

?

Single project price, often in combination
with performance guarantee
result:
**Potential higher first price,
more price certainty**

Bellingham Directs — Touch What You Know — Design-Builder Accountable

Initially Lowest Price — **Early Price Certainty** — **"Best Value" Price**

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Comfort Zone: Coordinating Easements Early

?

Touch What You Know
Early Price Certainty
Take Time to Do it Right
"Tried - True" Avoids Risk

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Comfort Zone: Coordinating Easements Early

Typical 5-year project involves multiple, discrete steps
result:
More detailed planning time

?

The same 5-year project might take 2 or 3 years involving parallel activities
result:
Less detailed planning time

Bellingham Directs	Touch What You Know	Design-Builder Accountable
Initially Lowest Price	Early Price Certainty	"Best Value" Price
More Prep Prior to Construction	**Take Time to Do it Right**	**Less Prep Prior to Construction**

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Comfort Zone: Minimizing Construction Impacts

?

Touch What You Know
Early Price Certainty
Take Time to Do it Right
"Tried - True" Avoids Risk

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Comfort Zone: Minimizing Construction Impacts

Complex challenges with technical alternatives
result:
"Proven"
Best Technical Approach

?

Complex challenges with technical alternatives
result:
"Innovative"
Best Technical Approach

Bellingham Directs	Touch What You Know	Design-Builder Accountable
Initially Lowest Price	Early Price Certainty	"Best Value" Price
More Prep Prior to Construction	Take Time to Do it Right	Less Prep Prior to Construction
"Proven" Approach	**"Tried - True" Avoids Risk**	**"Innovative" Approach**

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Comfort Zone Assessment Informs Procurement Method Selection

Where does Bellingham Fall?
City's "Comfort Level"

Key Issues: Order of Overall Importance

Bellingham Directs	1	**Touch What You Know**	Design-Builder Accountable
Initially Low Price	4	**Early Price Certainty**	"Best Value" Price
More Prep Prior to Construction	2	**Take Time to Do it Right**	Less Prep Prior to Construction
"Proven" Approach	3	**"Tried - True" Avoids Risk**	"Innovative" Approach

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Principles and Best Practices of Collaborative Delivery

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Collaborative Delivery Methods - Key Concepts

- **Collaborative Delivery Defined**
- **Spectrum of Collaborative Delivery Options**
- **Delivery Methods**
  - Baseline: Design-Bid-Build (DBB)
  - Construction Management at Risk (CMAR)
  - Design-Build
    - Progressive Design-Build (PDB)
    - Fixed Price Design-Build (FPDB)
- **Summary of Key Attributes**

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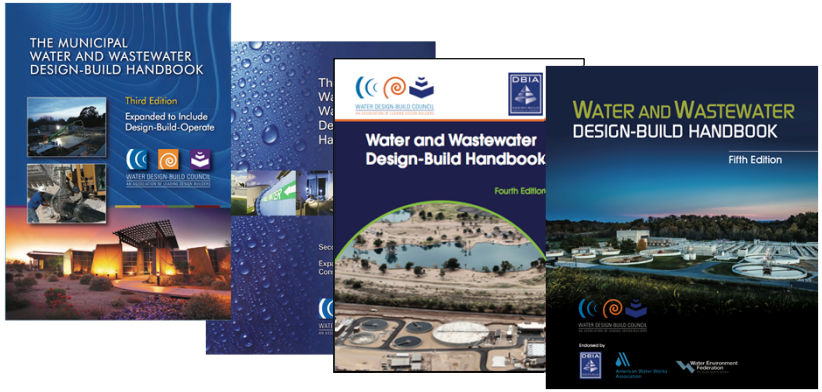
"~~Alternative~~ Collaborative Delivery"



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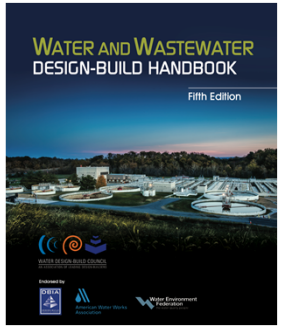
~~"Alternative~~ Collaborative Delivery"

Principles and Best Practices of Collaborative Delivery

For decades, water and wastewater agencies and utilities have used design-bid-build (DBB) as the primary approach to delivering capital projects. However, it is well documented that, in the past several years, the water and wastewater industry has turned increasingly to pursuing collaborative approaches. Today, the water market defines collaborative-delivery methods as construction management at-risk (CMAR), progressive design-build (PDB), fixed-price design-build (FPDB), design-build-operate (DBO), and public-private partnerships (P3).

-Fifth Edition, Chapter 2



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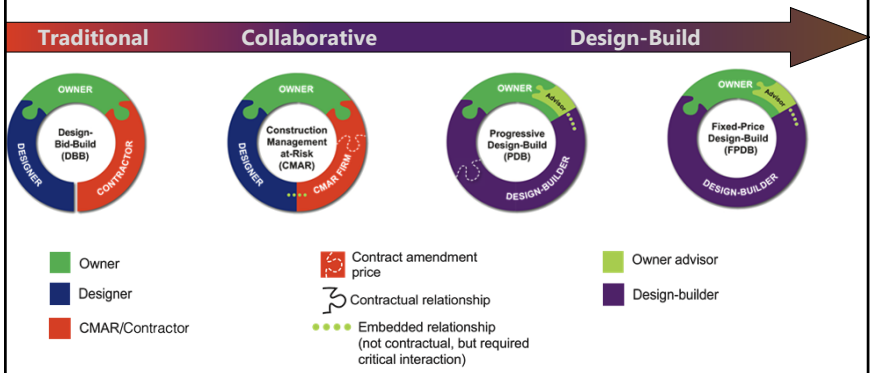
Spectrum of Collaborative Project Delivery Options



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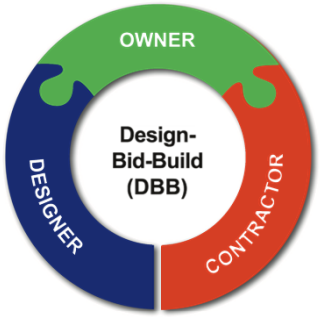
Baseline: Design-Bid-Build (DBB)

The traditional project delivery system for public entities under which the Owner holds separate contracts with a Designer followed by a Contractor.



- Traditional "cast" of participants
- Widely accepted, well established linear development process
- Distinct milestones that create expected results
- Design is completed prior to bidding
- Bidding is completed prior to construction

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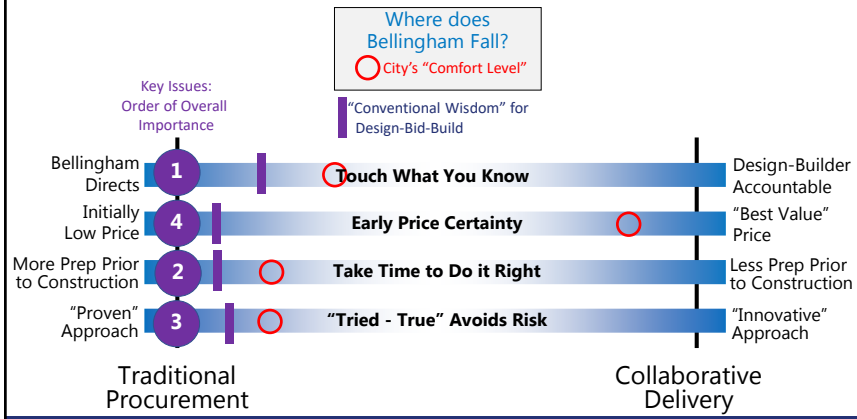
Design-Bid-Build Comfort Zones



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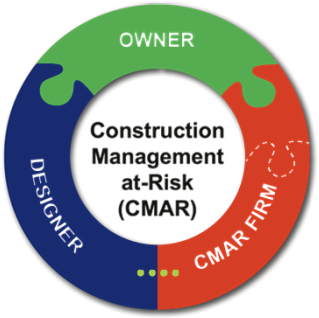
Construction Management at Risk (CMAR)

Separate contracts with a Designer and a Contractor, but working together.

Design is performed in parallel with the construction planning and estimating.

Construction can start after mutual agreement on cost and price.



- Familiar "cast" of participants, but can be delivered faster
- Still two separate contracts with CW
- Traditional selection of Designer, but alternative method to select the Contractor
- Sometimes called "design-build light" or an "arranged marriage"
- Construction costs estimated in parallel with design

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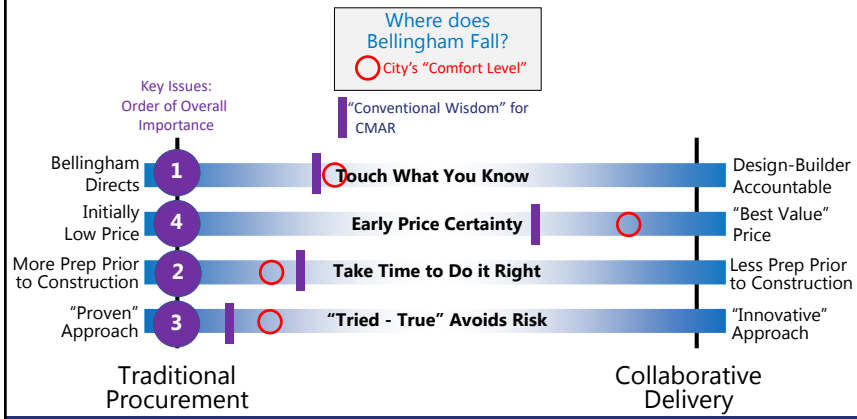
CMAR Comfort Zones



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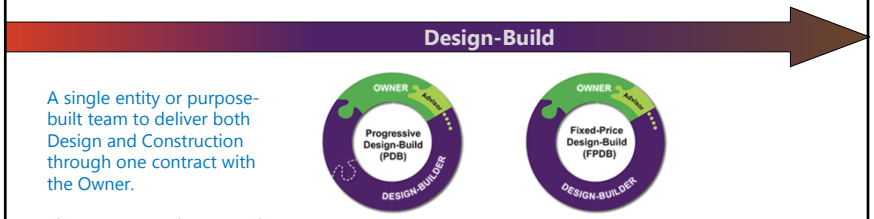
Multiple Approaches to Design-Build (DB)



A single entity or purpose-built team to deliver both Design and Construction through one contract with the Owner.

There are several commonly used variations of design-build:

- Progressive (PDB)
- Fixed Price (FPDB)

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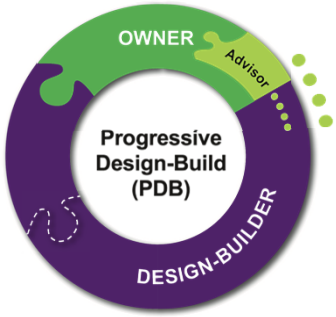
Progressive Design-Build (PDB)

A single entity or purpose-built team to deliver both Design and Construction via a single contract.

Design detail and construction estimate is developed progressively.

Construction starts after mutual agreement on price.



- New cast of participants
- Concurrent activities reduce schedule – construction can start before design is complete
- Selection based on quals and fee, not a fixed price
- "Design to budget" via design and estimate iteration
- GMP, Lump Sum, and Shared Savings options
- Hard-bid "off-ramp" if construction pricing not acceptable

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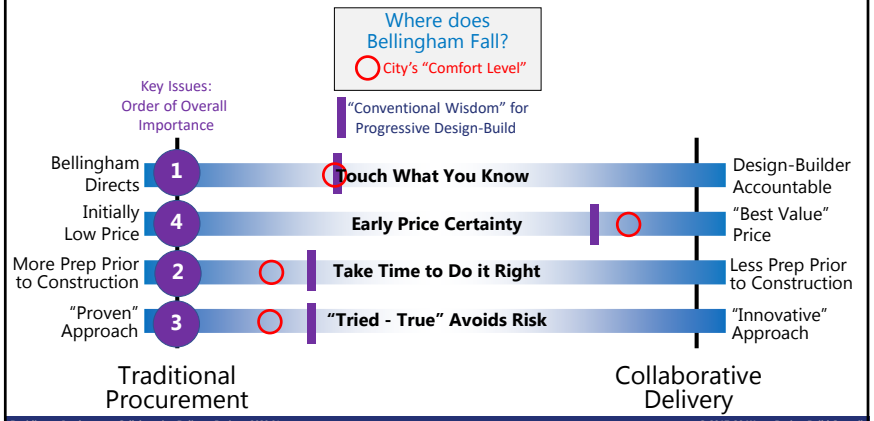
Progressive Design-Build Comfort Zones



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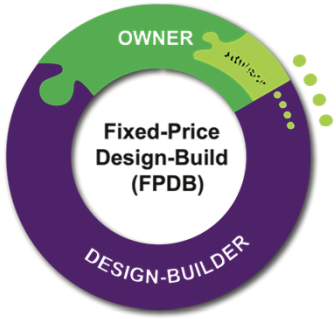
Fixed Price Design-Build (FPDB)

A single entity or purpose-built team to deliver both Design and Construction via a single contract.

Design detail and construction estimate provided as part of a fixed-price proposal.

Construction can start quickly after selection.



- Variable "cast" of participants, depending on project complexity
- Multiple variations: two-phase selection is common
- Can require a lengthy procurement process, reduced delivery time
- The proposal is essentially a "design competition"
- May use performance-based criteria or prescriptive criteria – or usually a balance of both
- Construction price fixed at selection

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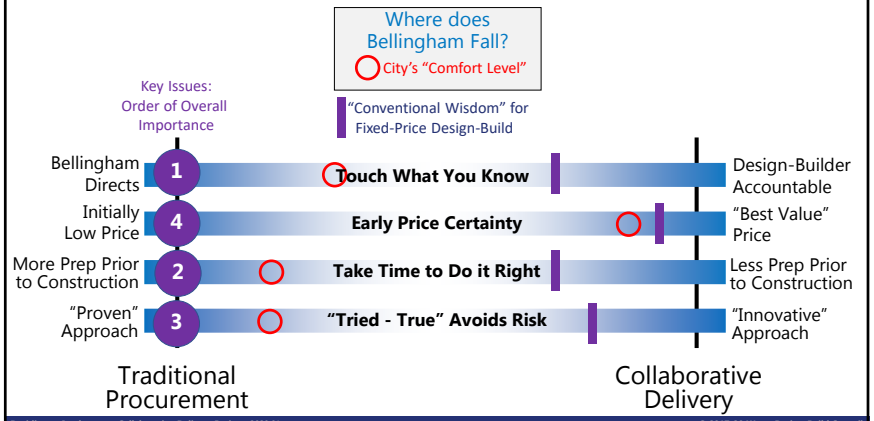
Fixed-Price Design-Build Comfort Zones



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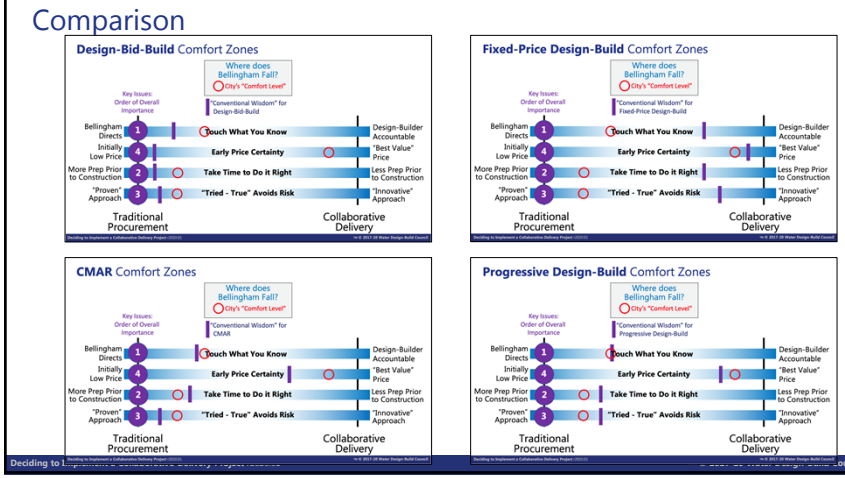
Comparison



Delivery Methods: Summary of Key Attributes

Most accepted method **Market test** **Initial cost certainty** **Existing procedures/contracts** **Legal everywhere**	**Allows Owner involvement** **Creates collaborative environment** **Potential schedule acceleration** **Accepted procurement process** **High market acceptance** **Availability of the off-ramp** **Potential for shared savings**	**Performance risk transfer** **Schedule acceleration** **Owner can stay involved (PDB)** **Design to budget (PDB)** **Availability of off-ramp (PDB)** **Early cost certainty early (FPDB)** **Potential for innovation (FPDB)**
Owner responsible for scope and unforeseen conditions	Owner responsible for scope and unforeseen conditions	Owner responsible for scope and unforeseen conditions
Owner "owns" delivery issues	Owner "owns" delivery issues, but mitigates challenges early	Design-builder takes responsibility for delivery
Well-understood risk allocation (history of Change Orders)	Existing risk allocation managed with early contractor involvement	Appropriate risk transfer (performance, schedule, permits)
Specification-based	Specification-based with input	Performance-based
Predictable schedule (linear and usually longer)	Accelerated schedule; concurrent procurements	Potentially fastest delivery; Concurrent design/construct
Proven and familiar, but known challenges to success	Design-Build "lite" – familiar yet introduces collaboration	Proven, but not as familiar Ensures collaboration
Multiple contracts and separate deliverables	Multiple contracts; coordinated deliverables	Single contract; single-point responsibility
Multiple procurements	Multiple procurements	Single procurement
Existing procurement process	Adapt existing process	New procurement process
Traditional roles	Traditional roles/untraditional times	New roles

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Next Steps

- Refine analyses based on comfort zones
- Workshop 3 – Risk Allocation
  - After April 26th

Attachment B: Delivery Model Analysis Workshop 3: Risk and Delivery

DRAFT for review purposes only. Use of contents on this sheet is subject to the limitations specified at the beginning of this document.
Bellingham Delivery Method TM17_DRAFT

Brown AND Caldwell

Bellingham, Washington

Delivery Model Analysis Workshop 3: Risk and Delivery

City of Bellingham WASHINGTON

May 4, 2021

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1

Agenda

- Review of Program Schedule/Critical Success Factors
- Presentation of Procurement Delivery Models
- Next Steps

2

Program Schedule

3

Critical Success Factors – Key Takeaways

1. Focus on operational priorities and impacts:
   a) Addressing operational objectives during design
   b) Lifecycle emphasis and pricing and decision-making
   c) Maintaining operations during construction
2. Level of "Touch" during design process:
   a) High Touch: Prescriptive requirements to reflect known preferences (City)
   b) Risk Avoidance: Proven technology for primary process components (BC)
   c) Lower Touch: "Other stuff" (Others)
3. Risk: willing to "buy it down"
4. Cost: early certainty preferred, "best value" means something
5. Schedule: take the time to do things "right"

4

Initial Assessment
(Where we left off...)

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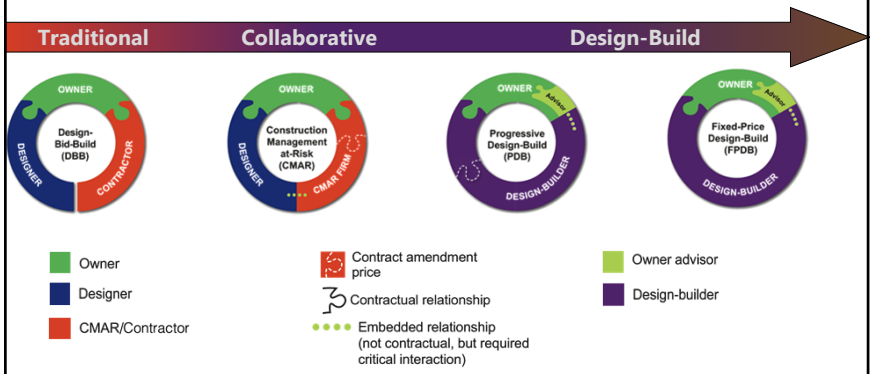
Spectrum of Collaborative Project Delivery Options



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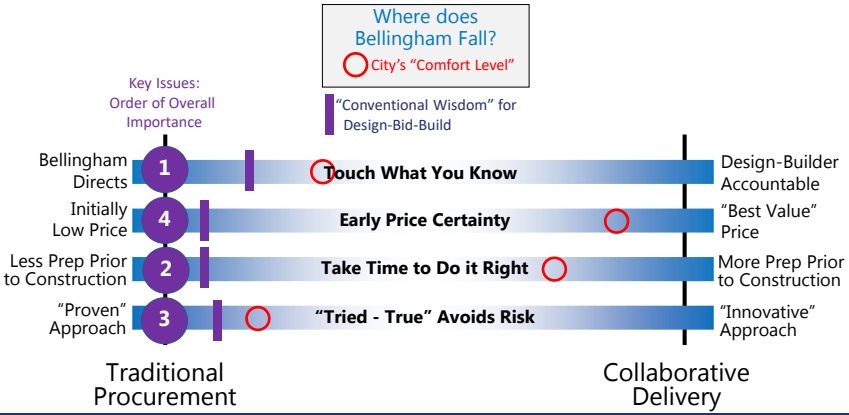
Design-Bid-Build Comfort Zones



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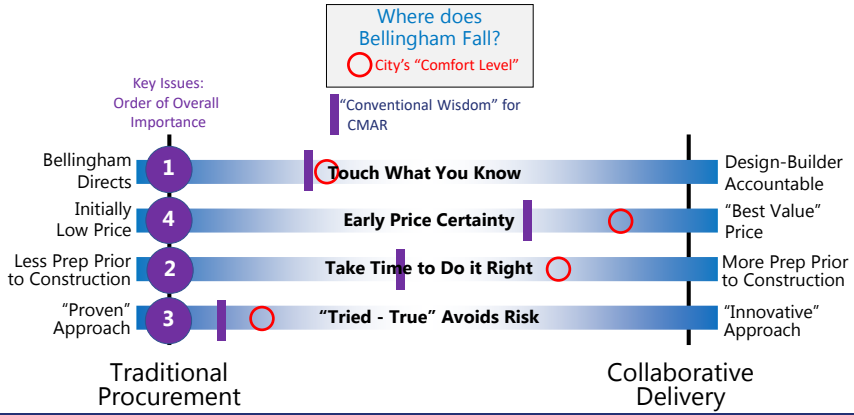
CMAR Comfort Zones



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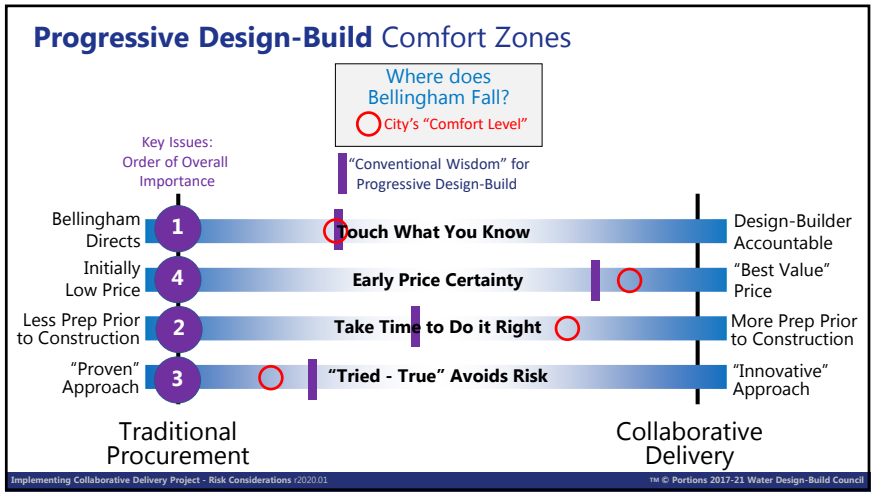

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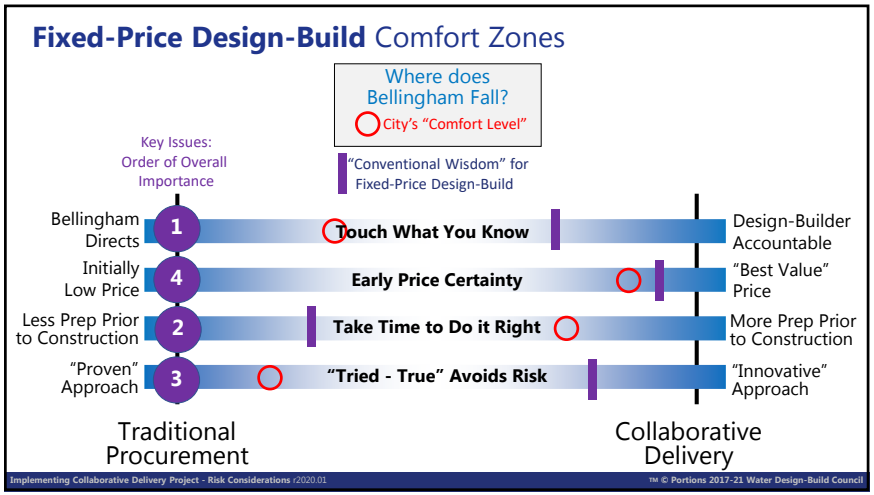

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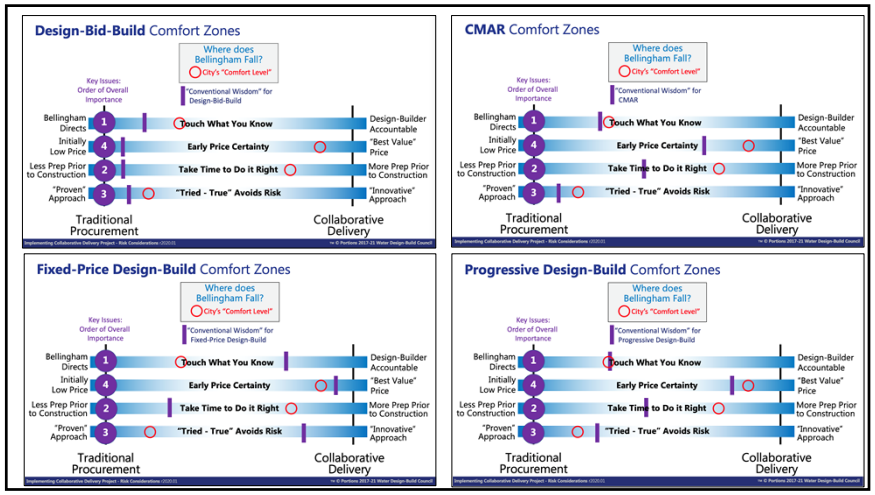

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One More Variable:
Risk Management Fundamentals

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Risk Management and Contracts: Key Concepts

- **Guiding principles of risk**
  - Risk-related definitions
  - Fundamental risk allocation shift:
    Traditional risk allocation to Performance-based Risk Allocation
- **Commercial concepts specific to CMAR and and Progressive Design-Build**

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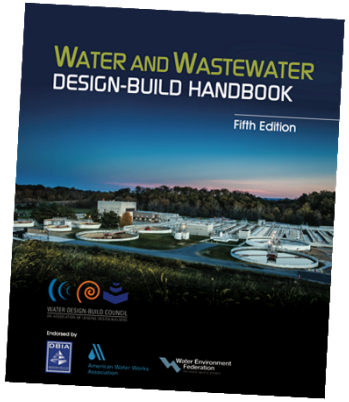
What is "Risk" and "Risk Allocation"?

-Fifth Edition, Glossary

Risk – Term used to recognize and understand what could potentially go wrong throughout a project. Effective risk management identifies the real and potential sources of problematic issues in the project, whether they are inherent in performing the work or embodied within the contract. Fundamental aspects of risk management include identification and assignment of each risk event to a responsible party and quantification of the risk to cost, schedule, quality, and safety based on probability and level of impact. (Chapter 3, p. 1)

Risk-Allocation Principles – Process of determining which party—owner or collaborative-delivery firm—will assume project risk as identified. In collaborative-delivery contracts, risks should be allocated to the party best positioned to manage them. (Chapter 3, p. 2)



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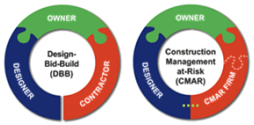
Design Build: A Fundamental Shift in Risk Allocation

Traditional Risk Allocation



Professional Services "Design" "Bid"

Scope
Planning, consulting, **design**, engineering, design, services during construction.

$$
Typically sold as **billable hours**.

Risk
Standard of care, competence is assumed, but responsibility for total installed cost and performance ultimately transferred to the Owner.

Construction "Build"

Scope
Equipment, materials, construction, startup, and construction warranty.

$$
Typically bid as a **fixed price**.

Risk
Conformance with as-bid documents, verified by a third-party, independently tested where appropriate, and managed through a quality compliance mechanism.

Defined Deliverables

Performance-Based Risk Allocation

Single Entity or Consortium "Design-Build"

Scope
A comprehensive project, inclusive of all scope from design through construction, and sometimes short- or long-term O&M.

$$
Proposed **fee on actual cost** (Progressive) delivered on a **GMP** or **lump sum** basis; or a **fixed price**.

Risk
Commitment to performance within a contractually defined set of input and output parameters.

Defined Project Performance

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Collaborative Project Risks and Allocation Principles

-Fifth Edition, Chapter 3, Table 3.1

- Retained by Owner
- Shared
- Assumed by Collaborative Delivery Entity

- Land and easement acquisition
- Project performance
- Technical requirements
- Site conditions
- Project design
- Schedule
- Environmental approvals and permits
- Building and administrative permits
- Coordination with existing facilities
- Cost of constructed project to guaranteed maximum price (GMP)
- Cost of constructed project to fixed price
- Construction warranty
- Fines and penalties
- Third-party and professional liability
- Proprietary process or equipment
- Uncontrollable circumstances
- Quality and quantity of influent (raw water or untreated wastewater)
- Quality and quantity of effluent (finished water or wastewater effluent)
- Materials cost escalation
- Force majeure

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Risk Allocation= Risk Management

-Fifth Edition, Chapter 3, Tables 3.1 and 3.2

- Land and easement acquisition
- Project performance
- Technical requirements
- Site conditions
- Project design
- Schedule
- Environmental approvals and permits
- Building and administrative permits
- Coordination with existing facilities
- Cost of constructed project to guaranteed maximum price (GMP)

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- Construction warrant
- Fines and penalties
- Third-party and profe
- Proprietary process o
- Uncontrollable circum
- Quality and quantity (raw water or untreat
- Quality and quantity water or wastewater
- Materials cost escalat
- Force majeure

RISK	RESPONSIBILITY							
	CMAR		PDB		FBDB		DBO	
	CMAR firm	Owner	Design-builder	Owner	Design-builder	Owner	DBO	Owner
Land and easement acquisition		X		X		X	X	X
Technical requirements		X		X		X		X
Project design		X	X		X	X	X	
Building and administrative permits	X		X		X		X	
Coordination with existing facilities	X		X		X		X	
Environmental approvals and permits[1]		X		X		X		X
Fines and penalties	X		X		X		X	
Proprietary process or equipment[2]	X	X	X		X		X	
Quality and quantity of influent (raw water)		X		X		X		X
Quality and quantity of effluent (finished water)		X	X		X		X	
Project performance[3]	X		X		X		X	
Existing site conditions		X		X		X		X
Schedule[4]	X		X		X		X	
Cost of constructed project to GMP	X		X		NA		X	
Cost of constructed project to fixed price	X		X		X		X	
Construction warranty	X		X		X		X	
Professional liability			X		X		X	
Defined uncontrollable circumstances	X		X		X		X	
Force majeure circumstances		X		X		X		X
Materials cost escalation[5]	X	X		X		X		X
Long-term operations and maintenance		X		X		X	X	

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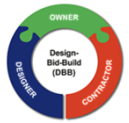
Progression of Risk Allocation and Management

Defined Deliverables



Designer
- Full plans (Standard of Care)

Contractor
- Conformance to plans, schedule, bid price

Designer
- Full plans (Standard of Care)

+ ***potential for design iteration***

Contractor
- Conformance to plans, schedule, ~~bid price~~

+ ***construction cost***
+ ***potential for partial design risk (obvious errors/ omissions)***

Defined Project Performance

Design-Builder
- Design risk (with potential exceptions)
- Cost estimate based on collaborative design and procurement
- Project performance
- Schedule
- Admin permits

Design-Builder
- Design risk (with ~~potential~~ ***few*** exceptions)

+ Cost estimate based on ***proposal*** ~~collaborative design and procurement~~
- Project performance
- Schedule

+ Admin + ***potential regulatory*** permits

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From Concept to **Contract**

-Fifth Edition, Chapter 3, Table 3.2

Collaborative Delivery
Best Practices for Risk Management

- Provide early communication with Proponents via a conceptual risk allocation table like this one (Pre-RFQ or with the RFQ)
- Use a design-build form of contract as a starting point (not a DBB contract)
- Provide more detail as the procurement progresses:
  - o Provide a DRAFT Contract with the RFP (or earlier, just after short-list)
  - o Provide opportunity for comment, input, and at least one revision prior to Proposal submittal
  - o Use confidential one-on-one meetings with Proponents for efficient commercial discussions

Create Risk Transparency

RISK	RESPONSIBILITY					
	CMAR		PDB		FBDB	
	CMAR firm	Owner	Design-builder	Owner	Design-builder	Owner
Land and easement acquisition		X		X		X
Technical requirements		X		X		X
Project design		X	X		X	X
Building and administrative permits	X		X		X	
Coordination with existing facilities	X		X		X	
Environmental approvals and permits[1]		X		X		X
Fines and penalties	X		X		X	
Proprietary process or equipment[2]	X	X	X		X	
Quality and quantity of influent (raw water)		X		X		X
Quality and quantity of effluent (finished water)		X	X		X	
Project performance[3]	X		X		X	
Existing site conditions		X		X		X
Schedule[4]	X		X		X	
Cost of constructed project to GMP	X		X		NA	
Cost of constructed project to fixed price	X		X		X	
Construction warranty	X		X		X	
Professional liability			X		X	
Defined uncontrollable circumstances	X		X		X	
Force majeure circumstances		X		X		X
Materials cost escalation[5]	X	X		X		X
Long-term operations and maintenance		X		X		X

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Risk Registers Create Risk Transparency

-Fifth Edition, Chapter 3, Figure 3.2

Sample Project Risk Register

Sample Description of Identified Risk	Risk Origination	Risk Area	Status	Estimated Value of Risk	Probability of Occurrence	Probability of Impact	Risk Assessment Level	Risk Probability (percent)	Potential Risk Impact ($)	Allocation	Sample Risk Mitigation Action
An 18-month schedule for this project is viewed as aggressive by the DB team. There will be an as-yet-to-be-identified daily liquidated damage assessment for both substantial and final completion.	DB Team	Prime Contract	New	TBD	Medium	Medium	High	60		Design-Builder	Negotiation of the prime contract should include a discussion of the schedule and assessment of the DB team's ability to meet schedule. If the owner is unable to provide more time for the project, then discussion of early procurement and construction needs to be offered as one way to meet schedule.
The procurement model requires the commitment of a GMP at the time proposals are submitted. The selected design-builder will be held to the proposed GMP price. As such, design change management will be essential to the success of this project.	DB Team	Cost Management	New	$500,000	Medium	Medium	High	60	$300,000	Design-Builder	First, the proposal needs to be clear with respect to the scope of work provided in the submitted price. Second, our design manager and lead engineers need to understand the project scope and readily discern additions/deletions to the project scope. These changes need to be collected and adjudicated weekly with the owner. Out-of-scope work is not to be performed without prior authorization from the owner.
While the new pump station is being constructed, the existing pump stations will need to remain in service.	DB Team	Constructability	New	$100,000	Low	Low	Low	40	$40,000	Design-Builder	Detailed Maintenance of Plant Operations Plans (MOPOs) will be developed and reviewed with owner operations staff for plant shuttdowns, piping and electrical tie-ins, required demolition activities, etc.
Pump delivery is on the project critical path.	DB Team	Schedule Management	New	$250,000	Medium	Medium	High	60	$150,000	Shared	Pumps may not be able to be manufactured, factory tested, and delivered to the project site when needed. Schedule impact mitigations may require paying an expediting fee to the manufacturer.
Cost Totals							**Aggregated Contingency**		**$490,000**		

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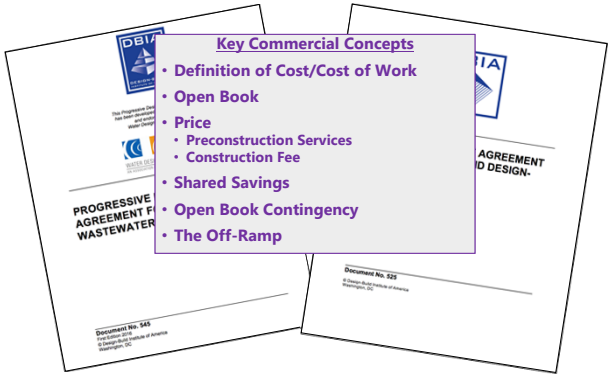
The Contract: Commercial Concepts



Key Commercial Concepts

- Definition of Cost/Cost of Work
- Open Book
- Price
  - Preconstruction Services
  - Construction Fee
- Shared Savings
- Open Book Contingency
- The Off-Ramp

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The Contract: Commercial Concepts

Key Commercial Concepts

- Definition of Cost/Cost of Wor
- Open Book
- Price
  - Preconstruction Services
  - Construction Fee
- Shared Savings
- Open Book Contingency
- The Off-Ramp

Key Commercial Concepts

- Definition of Cost/Cost of Work
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The Contract: Commercial Concepts

Key Commercial Concepts

- Definition of Cost/Cost of Work
- Open Book
- Price
  - Preconstruction Services
  - Construction Fee
- Shared Savings
- Open Book Contingency
- The Off-Ramp

Definition of Cost

- Critical foundation for all Open-Book methodologies: the contract should define what "Cost" means.
- Start with verifiable, documented actual cost of directly purchased goods and services.
- Define whether subcontracted scope is, by definition, a cost to the Prime Contract.
- Address "soft" cost such as overheads, equipment leasing, and other similar scope that can be open for interpretation.
- *Consider defining any "soft costs" up front, even if approximations (e.g., overhead rates).*

What are some other costs that are a challenge to validate?

How can these be defined ahead of time in the contract?

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The Contract: Commercial Concepts

Key Commercial Concepts

- Definition of Cost/Cost of Work
- Open Book
- Price
  - Preconstruction Services
  - Construction Fee
- Shared Savings
- Open Book Contingency
- The Off-Ramp

Open Book

- Requires costs to be clearly defined and validated.
- It means what it says: the estimate of costs is open, transparent, and shared among all parties.
- The degree of detail that is shared can be debated – but should be defined up-front.
- Subcontract quotes are treated as stand-alone costs, but the process for obtaining the quotes needs to be transparent.

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The Contract: Commercial Concepts

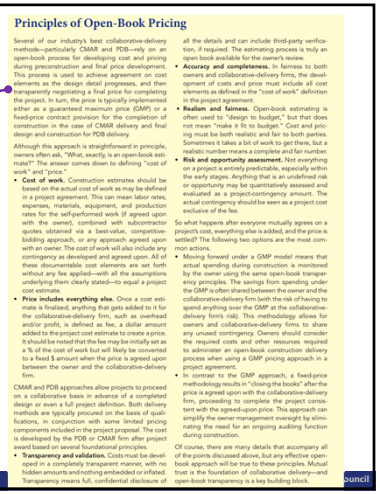
Key Commercial Concepts

- Definition of Cost/Cost of Work
- **Open Book**
- Price
  - Preconstruction Services
  - Construction Fee
- Shared Savings
- Open Book Contingency
- The Off-Ramp

5th Edition, Page 2-9

Applies to CMAR, Progressive Design-Build, and Cost + Fee methodologies

Does not apply to Fixed-Price methodologies or during Lump Sum delivery



Principles of Open-Book Pricing

Several of our industry's best collaborative-delivery methods—particularly CMAR and PDB—rely on an open-book process for developing cost and pricing during preconstruction and final price development. This process is used to achieve agreement on cost elements as the design detail progresses, and then transparently negotiating a final price for completing the project. In turn, the price is typically implemented either as a guaranteed maximum price (GMP) or a fixed-price contract provision for the completion of construction in the case of CMAR delivery and final design and construction for PDB delivery.

Although this approach is straightforward in principle, owners often ask, "What, exactly, is an open-book estimate?" The answer comes down to defining "cost of work" and "price."

- **Cost of work.** Construction estimates should be based on the actual cost of work as may be defined in a project agreement. This can mean labor rates, expenses, materials, equipment, and production rates for the self-performed work (if agreed upon with the owner), combined with subcontractor quotes obtained via a best-value, competitive-bidding approach, or any approach agreed upon with an owner. The cost of work will also include any contingency as developed and agreed upon. All of these documentable cost elements are set forth without any fee applied—with all the assumptions underlying them clearly stated—to equal a project cost estimate.
- **Price includes everything else.** Once a cost estimate is finalized, anything that gets added to it for the collaborative-delivery firm, such as overhead and/or profit, is defined as fee, a dollar amount added to the project cost estimate to create a price. It should be noted that the fee may be initially set as a % of the cost of work but will likely be converted to a fixed $ amount when the price is agreed upon between the owner and the collaborative-delivery firm.

CMAR and PDB approaches allow projects to proceed on a collaborative basis in advance of a completed design or even a full project definition. Both delivery methods are typically procured on the basis of qualifications, in conjunction with some limited pricing components included in the project proposal. The cost is developed by the PDB or CMAR firm after project award based on several foundational principles.

- **Transparency and validation.** Costs must be developed in a completely transparent manner, with no hidden amounts and nothing embedded or inflated. Transparency means full, confidential disclosure of all the details and can include third-party verification, if required. The estimating process is truly an open book available for the owner's review.
- **Accuracy and completeness.** In fairness to both owners and collaborative-delivery firms, the development of costs and price must include all cost elements as defined in the "cost of work" definition in the project agreement.
- **Realism and fairness.** Open-book estimating is often used to "design to budget," but that does not mean "make it fit to budget." Cost and pricing must be both realistic and fair to both parties. Sometimes it takes a bit of work to get there, but a realistic number means a complete and fair number.
- **Risk and opportunity assessment.** Not everything on a project is entirely predictable, especially within the early stages. Anything that is an undefined risk or opportunity may be quantitatively assessed and evaluated as a project-contingency amount. The actual contingency should be seen as a project cost exclusive of the fee.

So what happens after everyone mutually agrees on a project's cost, everything else is added, and the price is settled? The following two options are the most common actions.

- Moving forward under a GMP model means that actual spending during construction is monitored by the owner using the same open-book transparency principles. The savings from spending under the GMP is often shared between the owner and the collaborative-delivery firm (with the risk of having to spend anything over the GMP at the collaborative-delivery firm's risk). This methodology allows for owners and collaborative-delivery firms to share any unused contingency. Owners should consider the required costs and other resources required to administer an open-book construction delivery process when using a GMP pricing approach in a project agreement.
- In contrast to the GMP approach, a fixed-price methodology results in "closing the books" after the price is agreed upon with the collaborative-delivery firm, proceeding to complete the project consistent with the agreed-upon price. This approach can simplify the owner management oversight by eliminating the need for an ongoing auditing function during construction.

Of course, there are many details that accompany all of the points discussed above, but any effective open-book approach will be true to these principles. Mutual trust is the foundation of collaborative delivery—and open-book transparency is a key building block.

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The Contract: Commercial Concepts

Key Commercial Concepts

- Definition of Cost/Cost of Work
- Open Book
- **Price**
  - **Preconstruction Services**
  - **Construction Fee**
- Shared Savings
- Open Book Contingency
- The Off-Ramp

Price

- ***Cost*** is not the same as ***price***.
- Price includes ***cost*** *plus* ***anything else*** – including profit.
- Hard Bid, Lump Sum, and Fixed-Price approaches combine ***cost*** *plus* ***anything else*** (such as profit) to equal the ***price***.
- GMP and other open book approaches define and document actual ***cost***.
- A ***Fee*** is then added to cover ***anything else*** (typically overhead and profit) to define the ***price***.

An open book cost with a fee added to create a price can be converted to a Lump Sum, closed book approach for delivery.

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The Contract: CMAR/PDB Shared Savings

Key Commercial Concepts

- Definition of Cost/Cost of Work
- Open Book
- Price
  - Preconstruction Services
  - Construction Fee
- **Shared Savings**
- Open Book Contingency
- The Off-Ramp

Shared Savings

- Applies to "open book" approaches.
- Accommodates the potential for actual cost to be ***less*** than estimated cost (an ***underrun***).
- The Contract sets a ratio to ***share*** any ***underrun*** between the Owner and CMAR/Design-Builder.
- Shared savings can be reimbursed or used for additional scope.
- *Want to share an* ***overrun****? Consider a "Target Price" model*

PROS

- Incentivizes continued efficiency and VE *after* agreement on the price.
- Provides flexibility to add back desired scope that may have been removed to achieve price.
- Supports collaborative decision-making

CONS

- "If that price was so darn good, why should we have anything left over?"
- "Any savings should accrue to the public owner and ratepayers without sharing."
- "Efficiency should accrue to the Contractor – use Lump Sum."

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The Contract: CMAR/PDB Open Book Contingency

- **Risk and opportunity assessment.** Not everything on a project is entirely predictable, especially within the early stages. Anything that is an undefined risk or opportunity may be quantitatively assessed and evaluated as a project-contingency amount. The actual contingency should be seen as a project cost exclusive of the fee.

Contingency

- Fixed-Price Design-Builders will include contingency in their price, to use at their discretion.
- CMARs and Progressive Design-Builders must define contingency as part of project cost, based on a collaborative, open book risk and opportunity assessment.
- **The contract should define when the contingency can be used:**
  - **Does it cover scope changes?**
  - **Does it cover CMAR/Design-Builder construction errors?**

Owners may create two funds: one that they control and one that the CMAR/ PDB can use at will.

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The Contract: The CMAR/PDB Off-Ramp

Off-Ramp – Contractually defined option for the owner to use with a CMAR or PDB project that terminates a project agreement prior to the Notice to Proceed for Phase II services related to the construction of a project. The off-ramp may be taken when the owner and the collaborative-delivery firm are unable to agree on the price to construct the project. (Chapter 2, p. 11)

Off-Ramp. A contractually defined option for the owner with the CMAR or PDB project to end services with the collaborative-delivery firm prior to agreement on price.

The Off-Ramp

- Key Contract clause for CMAR and Progressive Design-Build.
- At the Owner's sole discretion, forgoes the construction phase.
- Owner has the option of finishing the design in any manner.
- Owner has the option of traditionally bidding the work.

Creates incentive
for the CMAR or Design-Builder
to achieve an agreeable GMP.

Downside for the Owner:
taking the off-ramp can significantly delay construction.

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Delivery Method Ranking Heat Map

Delivery Method Key Selection Criteria	Relative Importance to Bellingham	Design-Bid-Build Favorability	CMAR Favorability	Progressive DB Favorability	Fixed-Price DB Favorability
Potential Risk Transfer Benefits may HIGHLY Impact Delivery Method Selection					
***Ability* to transfer performance risk**		Very UNfavorable	UNfavorable	Favorable	Very Favorable
Relative *value* of risk transfer for SOLIDS	[LOW-MED]	Equipment warranty only	Extended warranty	Performance guarantee with LDs	Performance guarantee with LDs
Relative *value* of risk transfer for BIOGAS	[MED-HIGH]	Equipment warranty only	Extended warranty	Performance guarantee with LDs	Performance guarantee with LDs
Project-Specific Criteria HIGHLY Impacted by Delivery Model Selection					
Touch What You Know (City input/decisions on critical design/scope)	HIGH	Traditional design direction/interaction	Traditional design direction with contractor input	Collaborative interaction: City with design-builder	Design criteria set at RFP phase
Early Price Certainty (Set a realistic budget early, and stick to it)	HIGH	Price known after 100% design and bid, then subject to COs	Price known at 60% design, subject to GMP+COs	Price known at 60% design, subject to GMP	Price known at proposal, Very limited COs
Take Time to Do it Right (Go slower to get things set up well, and then go faster)	HIGH	Linear process takes too much time; limited collaboration	Phase 1 collaboration	Phase 1 collaboration	Heavy lift prior to RFP; some interaction during proposal
"Tried - True" Avoids Risk (Require proven technology for critical scope)	HIGH	City gets what it prescribes	City gets what it prescribes, with construction input	City gets what it prescribes, with DB collaboration	City prescribes performance specification, gets what it gets
Any Other Critical Issue(s) (Fill in for individual concerns)	?				
Other Criteria that COULD be Impacted by Delivery Model Selection					
WIFIA and Other Funding Considerations	MED	Long lead time to project shovel in the ground	Supports early application	Very integrated approach, supports application process	Earliest to be be shovel-ready
New/Complex Procurement Method	MED	Very familiar to City	Familiar to City	New to City, but similar to CMAR	Completely new procurement and contracting process
Market Acceptance/Interest	HIGH	Least popular method for quality contractors in W/WW	High interest from both engineers and contractors	High interest from both engineers and contractors	Limited interest in a busy market, high cost to propose

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Recommendation

- **CMAR** for lower risk transfer
  - **Pros:** Simpler procurement process; contract template in hand; design continuity
  - **Cons:** lack of risk transfer mechanism; traditional change order process during construction
- **PDB** for more risk transfer
  - **Pros:** Risk transfer potential; single entity coordination; single procurement; scope change management
  - **Cons:** New contract template/new procurement process; may not be value in risk transfer; requires OA scope
- Similar for **Both**
  - Price certainty at 60% design; collaboration during design process; high market interest; WIFIA compatibility; schedule efficiency

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Next Steps

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